

**Modoc National Wildlife Refuge  
Annual Narrative  
2003**

Reviewed and Approved by:

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Project Leader, Modoc NWR

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Date

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Refuge Supervisor, CNO

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Date

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Regional Office Approval

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Date

## Introduction

Fed by snowmelt from the Warner Mountains, the Pit River creates an oasis for wildlife in the high desert of northeastern California—Modoc National Wildlife Refuge. The Refuge was established in 1961 to manage and protect migratory waterfowl. Funds available under the Migratory Bird Duck Stamp Program helped purchase this Refuge. The 7,021 acre Refuge is located along the south fork of the Pit River in Modoc County, just south of the town of Alturas in extreme Northeastern California. The Refuge is bordered on the east by the Warner Mountains and on the west by the Adin Mountains. The Warner Mountain range rises to an impressive average elevation of 8,000 feet and contains extensive stands of ponderosa pine and white fir trees. This mountain range is also the principal watershed for the entire Pit River Valley west of it, which includes the Refuge. The landscape surrounding the Refuge includes rolling hills, canyons and plateaus with a sagebrush and juniper vegetative community.

Several habitat types are represented on Modoc NWR including freshwater lakes and ponds, irrigated meadows, farm land, natural flood plains, marsh communities, riparian corridors and sagebrush and juniper uplands. Soil types are mostly heavy clays having a high alkalinity. Black alkali surrounded by salt concentrations is not uncommon on the poorly drained areas of the Refuge.

Modoc NWR is one in a chain of National Wildlife Refuges along the Pacific Flyway extending from Alaska to Mexico. The Refuge is part of a larger complex of mid-altitude wetlands and lakes of Northeastern California and strategically situated as an important resting and feeding area for migratory birds. Permanent ponds, seasonal marshes and wet meadows attract thousands of waterfowl, shorebirds, raptors and songbirds to the Refuge as they make their journeys between nesting and wintering grounds along the Pacific Flyway. Modoc County acts as a migration hub and staging area for ducks, geese and other wetland birds on their southward migration that funnels into this region, which is 60 miles east of the Klamath Basin marshes. After feeding and resting on the Refuge, they continue to the Central and Imperial Valleys of California and other wintering areas. This pattern is reversed in the spring. The Refuge's wetlands and adjacent uplands are also an important nesting area for more than 76 species of ducks, geese, greater sandhill cranes and several other species of marsh birds. In total, more than 250 species of birds have been documented on the Refuge. In addition to bird species, the diverse habitats on the Refuge support a wide range of mammals, reptiles, amphibians, insects and plant life.

Modoc is one of over 540 refuges in the National Wildlife Refuge System — a network of lands set aside specifically to conserve fish, wildlife and plants. Managed by the U.S. Fish & Wildlife Service, the System is a living heritage, conserving wildlife and habitat for people today and for generations to come.

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## **A. HIGHLIGHTS**

- Rehabilitated waterfowl islands in Duck and Fluornoy Ponds (Section F.2).
- Completed major rehabilitation to Railroad/Gadwall ponds (Section I .2).
- Completed Phase I Grandma Tract wetland restoration project (Section I.2).
- Modoc National Wildlife Refuge Fire Management Plan completed (Section F.9).
- Started renovation and garage addition to headquarters residence (Section I.3).
- Centennial Time Capsule Dedication (Section H.6).
- Staff Members attended Pelican Island NWR Centennial Event (Section J.3).
- Refuge Wildlife and Habitat Management Review conducted (Section F.1.a).
- Initiated Canada goose collaring program (Section G.3.b).
- Completed one Farmer's Home Administration wetland restoration project (Section F.14).
- Completed one Partners for Fish and Wildlife wetland restoration project (Section F.15).

## **B. CLIMATIC CONDITIONS**

The Refuge has a semi-arid climate with dry, hot summers and cold winters. Summer temperatures can occasionally reach 100 degrees Fahrenheit (°F), but generally cool rapidly during the evening and nighttime hours. Nighttime temperatures can dip below 32°F during the summer months. January is the coldest month of the year, with temperatures occasionally dropping below 0°F. Daytime temperatures during January often exceed 40°F. Frost can, and usually does, occur in every month. Strong winds are common, especially during winter months. Precipitation generally occurs during the winter and spring months, with the Refuge receiving approximately 7-12 inches of rainfall annually.

The Refuge was anticipating a meager spring runoff due to a paucity of precipitation during the winter months in 2002-2003, but a wet spring filled Dorris Reservoir to capacity and much of the Pit River floodplain area flooded. The year progressed with typical temperature regimes and near normal precipitation. By the end of the year substantial snow pack had accumulated in the Warner Mountains and the Refuge was anticipating a high spring runoff.

Table 1 shows the summary of climatic conditions for Alturas during calendar year 2003.

<b>Table 1: Summary of Climatic Conditions in Calendar Year 2003 at Alturas Ranger Station</b>					
<b>Month</b>	<b>Avg. Min. Temp. in F°</b>	<b>Avg. Max. Temp. in F°</b>	<b>Avg. Temp. in F°</b>	<b>Total Precip. (inches)</b>	<b>Avg. Precip. (inches)</b>
January	40.84	33.74	48.06	1.04	1.51
February	35.7	26.5	54.29	0.59	1.27
March	41.2	32.55	50.32	1.69	1.37
April	38.4	30.37	46.53	1.85	1.07
May	53.26	40.94	65.48	1.22	1.30
June	65.47	50.40	80.87	0.10	0.95
July	74.06	58.90	89.35	0.08	0.29
August	67.87	53.65	82.06	0.90	0.34
September	66.00	50.43	81.67	0.40	0.48
October	56.61	42.35	70.94	0.00	0.93
November	35.83	28.23	43.47	1.68	1.45
December	33.93	28.57	39.50	2.97	1.51
<b>Total</b>	n/a	n/a	n/a	12.52	12.46

## **C. Land Acquisition**

### **1. Fee Title**

During 2003, a second appraisal of the Johnson Tract was completed in anticipation of acquiring this 200+ acre tract adjacent to Dorris Reservoir. An earlier appraisal had resulted in an offer that was not accepted by the landowners. The area for sale was subdivided from the rest of the property in the hope that this would allow for a higher appraisal. The appraisal was completed during the summer months and an offer was tendered, but was again refused by the landowner.

### **3. Other**

A Right-of-Way package was developed to provide ingress and egress between two private parcels abutting the refuge. The only access to the properties is via an existing ROW across Railroad tracks which separate the two from County Road 115. The refuge has always allowed access between the two tracts, but it

had never been formalized via a ROW document. The landowner was hoping to sell the two parcels and needed an official ROW to appease the County Planning Committee. The sale eventually fell through and the ROW was never finalized.

#### **4. Farmers Home Administration Conservation Easements**

Annual inspections were conducted on 5 FmHA easement properties administered from this office.

### **D. PLANNING**

#### **3. Public Participation**

The Refuge held two meetings with the Refuge Hunt Working Group to discuss proposed changes and gather input relevant to the hunt program. Meetings were attended by 6-12 people on average, and provided some very spirited debate at times. Overall participants were fairly pleased with the current program.

#### **4. Compliance with Environmental and Cultural Resource Mandates**

The following was undertaken at Modoc NWR in the year 2003 to meet with environmental and cultural resource mandates:

- Cultural clearance for wetland restoration on the Grandma Tract;
- Cultural clearance for all Rx fire units;
- Cultural clearance for WUI juniper thinning project at Dorris Reservoir;
- Cultural clearances for Talbott II and Whitehead PFW projects;
- Cultural clearance for Davis FSA easement wetland restoration;
- Cultural clearance for new delivery pipe to Upper Teal Pond;
- State Water Quality Control Board certification for Davis FSA easement wetland restoration.

#### **5. Research and Investigations**

Approximately 4,000 to 5,000 Canada geese (CAGO) utilize Modoc National Wildlife Refuge (Modoc NWR) throughout the year. An average of 506 pairs produced an average 1,390 CAGO year from 1972 – 2002. Questions regarding CAGO breeding bird habitat utilization and distribution and post brood rearing dispersal and subsequent spring arrival dates within Modoc NWR and adjacent northeast California lands remain unanswered. Previous studies completed by California Department of Fish and Game noted that spring CAGO sightings on Modoc were dominated by birds collared while molting at Goose Lake, north of Modoc, but it was not determined that those birds necessarily nested at Modoc. That particular study also pointed out there is uncertainty about how much time the various flocks of CAGO spend on wintering grounds away from the northeastern part of the state.

In 2003, a visible neck collar program was implemented in order to determine local habitat use and distribution and dispersal and arrival within Modoc NWR



and adjacent habitat in northeastern California. In June, 143 CAGO were collared and banded and 13 additional CAGO were leg banded only. Leg banding alone would not completely provide the required information due to low band return data. Moreover, due to their visibility, neck collars have the potential to provide multiple return data over time. The collaring portion of the study will continue through 2004. The objectives of the CAGO collaring program were to:

- Determine site-specific habitat utilization and distribution information within Modoc NWR and adjacent habitats in northeastern California, and;
- Determine Modoc breeding CAGO dispersal (post brood rearing) and subsequent arrival time to and from Modoc NWR.

Greater sandhill crane banding and monitoring efforts were continued with 48 breeding pairs and 39 nests located and 22 cranes captured and banded.

Waterfowl banding continued on the Refuge this year through the use of baited traps and airboat capture. 189 ducks were banded in August and September.

The Mapping Avian Productivity and Survivorship (MAPS) program was fully operational in 2003. MAPS operated eight days from June through August when 151 neo-tropical migrants comprised of 22 species were mist netted and banded.



Canada Goose 085E on Teal Pond.

## **E. ADMINISTRATION**

### **1. Personnel**



Personnel at Modoc NWR during the calendar year 2003 included (from left to right in photo):

Greg Albertson - Engineering Equipment Operator, WG-9, Perm. full-time, EOD- 3/93  
Carl Cox - Gardener, WG-4, Seasonal Term., EOD-4/02  
Shannon Ludwig - Wildlife Biologist, GS-11, Perm. full-time, EOD-7/02  
Bradley Storm - Engineering Equipment Operator, WG-9, Perm. full-time, EOD-9/88  
Steve Clay - Refuge Manager/Project Leader, GS-12, Perm. full-time, EOD-10/01  
Alicia Winters - Administrative Assistant, GS-6, Perm. full-time, EOD-5/02

Table 2: Staffing Levels at Modoc NWR from 2001 to 2003

Year	Full-Time	Part-Time	Temporary
2001	5*		
2002	5*		
2003	5		2

\*only through a portion of the year

### **2. Youth Programs**

Our YCC program, which operated from June 16 through August 9 and involved young adults from the local area, accomplished many tasks for the Refuge this year. The crew consisted of six enrollees and a crew leader. One participant quit after one day of work and one quit on July 11<sup>th</sup> due to military obligations. Some of the projects included fence removal and converting boundary fences into wildlife friendly fences, fence building, setting up wheel-lines, waterfowl trap construction and sandhill crane banding.

The total number of hours worked by the participants, including the crew leader, was 1,588 man-hours. Out of the total hours worked, 127.5 man hours were spent in formal education on topics ranging from the history of Modoc NWR, wetlands ecology and management, archaeology, wildlife management, water quality, and bird identification, including searching for greater sandhill crane colts. A total of 17.5 man hours were spent on recreational activities including swimming and a barbecue. The remaining 1443 man hours were spent on numerous labor intensive projects detailed in Table 3.

**Table 3: Youth Conservation Corps Projects and Man Hours at Modoc NWR**

Project	Man Hours
Noxious Weed Control	29
Fence Removal	391.5
Canada goose drive trap construction	114
Duck trap construction	56
Wheel-line set up and maintenance	152
Painting	87.5
Hunt blind relocation	39
Canada goose banding	20
Goose nest platform removal	45
Tree cage removal	24
Fence Building	200
Sandhill crane colt banding	88.5
Concrete slab pouring	20
Tour route sign installation	34
Re-roof pens at Headquarters	37.5
Install erosion control mats on waterfowl islands	35
General Maintenance	71.5

The YCC participants were encouraged to be aware of the purposes and goals of each project and how it related to the successful management of the Refuge. The program was very successful because it not only provided a means to complete a large amount of refuge projects but it also provided the YCC participants with an awareness of the Refuge and the Refuge System.



YCC Enrollees installing erosion control blankets





YCC enrollees banding Canada geese

#### **4. Volunteer Program**

The volunteer program accounted for 127 hours of effort during 2003. Projects assisted by volunteers included:

Removal of old barbed-wire fencing to allow for easier movement of wildlife across Refuge boundaries; planting native grass at the Godfrey Tract stream bank restoration site; noxious weed eradication, and waterfowl banding.



Planting native grass at the Godfrey Restoration Site

## 5. Funding

The following table outlines funding for the Refuge over the past three years.

Subactivity	2001	2002	2003
1121	\$40,217	\$10,500	\$45,250
1261-base	\$326,030	\$313,789	\$351,203
1261-CCS			\$30,500
1262 – Ann. Maint.	\$10,500	\$30,000	\$40,726
1262 – MMS	\$135,600	\$168,513	*\$266,370
6351	\$5,026	\$7,315	\$1364
9251	\$0	\$1,500	\$1500

\* Includes Rental , YCC, and SAMMS funds

## 6. Safety

Safety meetings were held nearly every month throughout the year with a variety of topics discussed. Some of the items discussed at these meetings included pesticide handling, winter/defensive driving, proper lifting/office safety, anti-lock brakes and heat stroke/dehydration. Annual walk-around inspection was completed in April. Mandatory CNO Safety training was given to all staff by RO Safety personnel in December. An Environmental Compliance Audit was conducted during August. Safety deficiencies were corrected or will be as funds permit. There were no vehicle accidents to report for the year.

Staff members Alicia Winters and Shannon Ludwig were provided ATV operators training through certified ATV instructor Doug Leehman from Hart Mountain National Antelope Refuge.

## 7. Technical Assistance

In 2003, the Refuge assisted the Natural Resource Conservation Service (NRCS) with a Wetland Reserve Program (WRP) assessment on a completed WRP project on a ranch in MacArthur, CA.

The Refuge also assisted the NRCS on multiple WRP evaluations in MacArthur, Fall River and Ash Valley, near Adin, where the Refuge served as the Fish and Wildlife Service official representative to determine if the project would meet the WRP criteria.

The refuge continues to provide technical assistance to Central Modoc Resource Conservation District (CMRCD) with riparian restoration and wetland design on local private lands projects within the Pit River watershed.

## **8. Other**

The Refuge was chosen to implement SAMMS in FY03. The Refuge Manager and EEO, Greg Albertson, received training at NCTC during July. In addition, the Refuge received \$20,000 in additional 1262 funds to help implement SAMMS on the station.

A Refuge Revenue Sharing check in the amount of \$25,824.00 was issued to Modoc County on 6/23.

## **F. HABITAT MANAGEMENT**

### **1. General**

**A.** The mission of the U.S. Fish and Wildlife Service (Service) is “...*working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people*” (NPI 99-01). In order to address the mission and its extensive array of statutory responsibilities, the Service implemented an ecosystem approach to fish and wildlife management. The goal of the Service’s ecosystem approach is “...*as the Service, working closely with others, carries out its mission and mandates, it will constantly strive to contribute to: the effective conservation of natural biological diversity through perpetuation of dynamic, healthy ecosystems*” (052 FW1.3B{1}).

In support of the Service’s mission, the National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668 dd-668ee, recently amended by the National Wildlife Refuge System Improvement Act of 1997 - Improvement Act [052 FW1.3B{1}]), specifically directs the Service to “...*provide for the conservation of fish, wildlife, and plants within the System; ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans...*” and “... *monitor the status and trends of fish, wildlife, and plants in each refuge.*” In addition, each refuge should support the following System goals (DO 132):

- Fulfill our statutory duty to achieve refuge purpose(s) and further the System mission.

- Conserve, restore where appropriate, and enhance all species of fish, wildlife and plants that are endangered or threatened with becoming endangered.
- Perpetuate migratory bird, inter-jurisdictional fish, and marine mammal populations.
- Conserve a diversity of fish, wildlife and plants.
- Conserve and restore where appropriate representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems.
- Foster an understanding and instill appreciation of native fish, wildlife, and plants, and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Adjustments are made to refuge wildlife and habitat management programs (adaptive management) based on periodic evaluations. Most refuges annually use an informal approach to adaptive management to make adjustments in programs. However, there is a need to occasionally conduct more formal evaluations to ensure refuge management programs are consistent with national, regional, ecoregional and administrative policies; and reflect consideration of current scientific knowledge. These evaluations are needed to provide accountability and feedback and to determine if wildlife and habitat management goals and objectives are being met at all levels. Regional Office biological staff conduct refuge reviews for specific management programs (e.g., grazing, wetland, farming), the overall program, or entire refuge operations. Refuge managers, biologists, and Service personnel from other divisions within Region 1; as well as experts from other agencies (state, federal, county, tribes); universities; and the private sector that have expertise regarding the subject(s) of the review assist with conducting these reviews.

A Wildlife and Habitat Management Review (WHMR), which is an evaluation of the wildlife and habitat management program, was conducted by a review team from June 30 - July 3, 2003 at Modoc National Wildlife Refuge. Its purposes were the following: 1) determine if the wildlife and habitat management program supports refuge purposes as well as the Improvement Act and Service policies regarding fish and wildlife management; 2) identify short- and long-term visions for habitat and wildlife management; 3) identify measures, if needed, that would improve wildlife and habitat management as well as contribute to ecological integrity of the System from local, regional, ecosystem, and national scales; 4) identify monitoring needs required to implement adaptive management; and 5) identify staffing/equipment needs required to optimize management to accomplish/address the highest biological and habitat management recommendations. *A Modoc National Wildlife Refuge Wildlife and Habitat*

*Management Review* document was prepared and can be found in the Refuge library.

The WHMR involved a series of discussions involving Modoc NWR staff and WHMR team members about the Refuge wildlife and habitat management program, field trips throughout the Refuge, and close-out discussions. Recommendations were formulated about wildlife and habitat management issues by the WHMR team members during the site visit. The recommendations were presented in a Close-out document and are within the *Modoc National Wildlife Refuge Wildlife and Habitat Management Review* document.

**B.** Although some refuges are undisturbed wilderness areas, most are actively managed to provide food, water and shelter for wildlife. Utilizing a variety of techniques, managers of national wildlife refuges restore and enhance lands and waters to increase their value to wildlife.

The Pit River watershed is located in northeastern California, at the western edge of the Great Basin Province. The headwaters are drained by the North and South Fork of the Pit River. The North Fork of the Pit River originates at the outlet of Goose Lake, an enclosed basin, and the South Fork of the Pit River originates from several tributaries in the south Warner Mountains. The confluence of both forks is located south of Alturas, where the mainstem Pit then flows southwesterly to Shasta Lake in Shasta County, and eventually into the Sacramento River and the Bay Delta of San Francisco Bay. In all, there are 21 named tributaries, totaling approximately 1,050 miles of perennial stream and encompassing 4,324 miles.

Refuge wetlands are maintained by a complex and extensive irrigation system to allow for flooding and draining of various habitats. Water is conveyed through a system consisting of an 11,500 acre foot storage reservoir (Dorris Reservoir), 20 miles of major canals, 50 miles of minor ditches, the South Fork of the Pit River and several pond and marsh units. This system provides water for all the wetland areas on the Refuge and is managed to produce the maximum benefits for wildlife and habitat. Planned annual operations include maintaining appropriate water levels throughout the system while supplying a continuous flow of fresh water.

The Refuge receives water from the South Fork of the Pit River, Pine Creek direct diversion and Pine Creek and Parker Creek storage into Dorris Reservoir. The South Fork of the Pit River flows through the Refuge and provides riparian flood water to wetlands and riparian areas on the west side of the Refuge including the Sharkey Field, North and South Grain Fields, Matney Fields, Pit Marsh, Matney Marsh, 395 Ponds and the South Dam Pond. Pine Creek direct diversion provides water to the Hamilton Tract and Pine Creek Field. Storage water in Dorris reservoir provides water to the remaining wetlands, meadows and ponds within the Refuge.

Due to a wet spring and heavy spring runoff, most of the floodplain area flooded and Pine Creek and Parker Creek overflowed.





South Fork Pit River flooding in floodplain area.



Parker Creek nearly overflowing.

Projects completed within the water delivery system included cleaning the Heifer canal and coring and re-packing the Heifer dike. No other major projects were completed within the water delivery system in 2003 other than general annual maintenance. At Modoc NWR, several habitat management techniques were utilized in the year 2003 and are described throughout the text that follows.

## **2. Wetlands**

Wetlands are among the most productive habitats in the world for fish, wildlife and humans. To birds, not all wetlands are created equal. Some prefer deep water for fishing; others prefer warmer, shallow water with its wealth of aquatic plants and insects; some simply need a mere inch or two of water to probe for invertebrates in recently exposed mud.

In the arid West, water has always been a valuable commodity to all forms of life. Water and wetland habitat are the keys to attracting migratory birds and other wildlife in this high desert area. But as human use of water has grown, the amount remaining for wildlife continues to diminish. At one time, the State of California had over 4 million acres of wetland habitat. Today, less than five percent remains. The practice of draining wetlands and diverting streams to other uses, which began in the late 19th century, has made these precious resources far less common in the arid West. Modoc NWR contained limited wetland habitats when originally acquired. The marshy character of the area had been altered by agricultural drainage, particularly along the South Fork of the Pit River. Wetlands within the Refuge have been restored over time to provide valuable wildlife habitat.

Water is key to attracting waterfowl in this high desert area. Balancing human consumption with wildlife needs requires careful water conservation and management strategies. The staff uses the Refuge's elaborate water control system to fill or drain permanent ponds and seasonal marshes to meet the needs of many wildlife species simultaneously. Planned annual operations include maintaining a balance of non-fluctuating and fluctuating water levels throughout the system while supplying a continuous flow of fresh water.

Ample water flowed through the South Fork of the Pit River to maintain the wetlands dependent on this water source, as well as allow the majority of the water features in the hunt area to be near full capacity or flooded in time for the opening of hunting season.

Dorris Reservoir recharged to full capacity by the beginning of irrigation season, so water quantity was not an issue. Maintenance staff did an excellent job of meticulously monitoring and maintaining the water levels in the wetlands, ponds and wet meadows. No significant habitat areas in the system were unintentionally dry.

#### Duck and Fluornoy Ponds

The Duck and Fluornoy ponds were dried down in order to rehabilitate the waterfowl islands within the system. All of the islands were re-shaped and scraped down to an elevation ranging from 1 foot to 3 feet above the normal high water mark to create more useable loafing and nesting islands. Six islands in Fluornoy and Upper Duck Pond were treated with erosion control blanket to decrease erosion to island margins. One island in Fluornoy Pond was stabilized with hay bales to decrease erosion, but because the bales were not secured to the islands, most bales floated away.

The waterfowl islands in Teal Pond were also treated with erosion control blanket in February and August, 2003. Some of the islands treated in February were re-treated because the blanket material decomposed. The blanket material appears to work in the short-term, but does not appear to be a viable, or cost-effective, solution to keep the islands from eroding until vegetation becomes established at the margins.

Large areas of cattails along the margins of the Duck ponds were disked, thus creating more foraging areas and brood water for waterfowl.

#### Railroad and Gadwall Ponds

The Railroad and Gadwall Ponds were rehabilitated and merged when four interior dikes and one large island were removed to create one larger pond. Over ¼ mile of interior dikes were removed including one separating two small ponds (Gadwall Ponds) and one separating Gadwall Ponds from Railroad Pond. Additional work included removing unnecessary canals within the system. The rehabilitation within the pond system enables increased water control efficiency by decreasing the number of water control structures from six to two. The merging of the ponds also provides more foraging area and brood water for migratory birds. A shallowly submerged gravel bar was also built within Railroad Pond to provide additional shorebird foraging areas.

#### South Grain Field

The South Grain Field (120 acres), which was taken out of grain, disked and subsequently flooded in fall, 2002, continued within a moist soil management program. The spring vegetation response was favorable due to an emergence of swamp timothy around the field margins and an unidentified herbaceous plant across much of the field interior. Waterfowl utilization was fairly high in fall subsequent to flooding, but decreased throughout the winter as the water froze and the seed crop diminished. The management of the unit will continue with the scheme of spring draw-down and fall flooding to further encourage the growth of desirable annuals such as swamp timothy and smartweed.

#### Matney Fields

The historical management scheme of the Matney Fields included farming spring barley and winter wheat crops, but they were not meeting their potential yield due to possible factors including, but not limited to:

1. No crop rotation. The Matney fields have been planted to cereal grain crops for approximately 15-20 years without rest or rotation.
2. Nutrient depletion. The lack of crop rotation or rest may have led to soil nutrient limitation or depletion.
3. Soil moisture may be limiting. Lack of adequate spring moisture resulting from inadequate precipitation or irrigation may have resulted in low crop yields.
4. Weed management. Competing vegetation may be reducing the available sunlight, nutrients, and water thus reducing the overall yield of the crops.

The following management prescription was employed with the goal of increasing waterfowl utilization and providing more foraging opportunities for migratory birds:

1. Create a 1-3 year seasonal wetland rotation within 3 fields. This puts approximately 30% in wetland rotation. Flood the fields in the fall (September – November) and draw them down early and slow (May 1 – May 15) or midseason and slow (May 15 – May 30). The potential fields should have the ability to be flooded and drained.

Matney Field number 4 was split in half by creating a berm thus allowing the south half to be independently managed and put into a wetland rotation. Matney Fields 7 and 8 were the remaining two fields put into the wetland rotation. The three fields were left idle and sequentially flooded from early fall to early winter. The existing vegetation and volunteer grain provided ample foraging opportunities for waterfowl as evidenced by periods of high utilization within the flooded units. The seasonal wetland management scheme will continue in the three Matney Fields in 2004.

#### Grandma Tract

Grandma Tract Phase I wetland restoration project commenced in the south portion of the unit. Ducks Unlimited contracted the work out and served as project managers.

A new, non-linear swale was constructed through the unit and will now be used to convey Dorris water to the west side of the Refuge. The old delivery ditch along County Road 56 will no longer be used. Also, a series of low-level berms with water control structures were constructed perpendicular to the new swale which allows water to be shallowly ponded within the unit. The berms also allow water to sheet flow across the south unit, thus irrigating and creating a wet meadow system.

Water was diverted through the swale after construction was completed to check for operation. The unit may require some additional work and one or two years to self organize before it is completed.

#### Indian Ponds

The Indian Ponds, de-watered when the Duck and Fluornoy Ponds were drawn down, were rehabilitated by disking the cattails and creating a more open water system. The treatment produced additional brood water and foraging areas for waterfowl.

### **4. Croplands**

The farming program at Modoc NWR is conducted entirely by force account and is intended to provide a high energy food source, such as barley and wheat grain, for waterfowl and greater sandhill cranes during migration. Also, throughout the year, these planted fields help to avoid waterfowl depredation on adjacent, private farm lands. This year a total of approximately 166 acres of Refuge lands were planted with grain. Approximately 43 acres were planted with spring barley in Matney Fields #3, 5, 6 (23 ac.) and 4 North (20 ac.). Approximately 123 acres were planted with winter wheat in the North Grain Field (80 ac.), Matney field #3 (23 ac.), Hamilton (28 ac.), Goose Pond Field (5 ac.), and Grandma Field (10 ac.). All grain was planted at a rate of approximately 60 to 65 pounds per acre. The spring barley yield in Matney 3 and 4 North were very poor and did not support much wildlife utilization. Matney 3 was then replanted with winter wheat.

Matney Fields 1 (8 ac.) and 2 (8 ac.) were planted with a mixture of native grasses in late summer and then irrigated. The fields were also treated to control Canadian thistle. Native seed germination was low, but it will take a year or two to determine success.

## 6. Other Habitats

Six habitat types are found at Modoc NWR – upland, wet meadow, freshwater lakes/permanent ponds, fresh emergent wetlands/seasonal marsh, woody riparian and farmed grain fields. Together, these habitat types cover approximately 7,011 acres of Refuge land, with the remaining 10 acres classified as administrative sites. Table 4 shows estimated acreage by habitat type in the Refuge.

**Table 4: Estimated Acreage by Habitat Type on the Modoc National Wildlife Refuge**

<i>Habitat Type</i>	<i>Total Refuge Acres</i>
Upland - grass or shrub land	1,514
Wet Meadow	3,485
Freshwater lakes/Permanent Ponds	1,000
Fresh Emergent Wetlands/Seasonal Marsh	200
Woody Riparian	246
Farmed Grain Fields (dry land)	566
Administrative Site	10
Total Acres	7,021

Small, but important, riparian areas on the Refuge provide erosion control by regulating sediment transport and distribution, enhance water quality and produce organic matter for aquatic habitats. They also provide wildlife habitat for mammals, raptors, woodpeckers and neotropical migrants such as warblers, swallows, flycatchers and sparrows. Riparian areas are among the most diverse, dynamic and complex biological systems, and contribute significantly to our regional biodiversity.

The riparian area associated with Pine Creek that passes through the Refuge has been in a non-use status since 1983 when cattle's grazing in the area was eliminated. Planted and previously existing willow trees, narrow-leaf cottonwood trees and wild rosebushes continue to thrive and provide excellent cover for wildlife. Additionally, the riparian area at the Sub-headquarters unit remains in non-use status with planted and previously existing trees thriving.

No significant management activities or improvements occurred within woody riparian areas of the Refuge in the calendar year 2003.

Non-woody riparian habitat exists along the Pit River in narrow bands and contributes to stream bank stabilization and flood attenuation. The vegetation is mostly comprised of reed canary grass and several species of rushes and sedges. Much of the Pit River stream bank has been vertically down-cut over time due to changes within the landscape, including loss of riparian vegetation, agriculture, grazing, upstream channelization and ditching and altered natural flow regimes. Much of the down-cutting and degradation occurs along the South Fork portion and along the main stem within the Godfrey Tract.

#### ***a. Wet Meadows***

These communities typically exhibit shallow surface water or saturated soil conditions. Wet meadows occur over most of the Refuge and are associated with its developed irrigation system. They are dominated by herbaceous plants, including Baltic rush, a variety of sedges and other rushes and Reed canary grass.

Modoc NWR has approximately 3,500 acres of grasslands that are managed for greater sandhill crane and waterfowl production. Approximately 2/3 of these grasslands are irrigated and managed as wet, short-grass meadows that provide succulent green browse for Canada geese and nesting and foraging habitat for greater sandhill cranes, rails, common snipes and Wilson's phalaropes. Ducks also utilize these irrigated fields as foraging areas during spring migration and, to a lesser extent, for nesting purposes. A late-season haying program is conducted on a portion of these fields to provide an effective and economic tool that encourages green browse and nesting and foraging habitat. Depending on the post-haying growth, some of these fields are also grazed following the removal of hay in August. All of the hayed/grazed fields are typically flooded in the spring (April) to provide green browse for geese and foraging habitat for greater sandhill cranes and migrant waterfowl staging within the Refuge. For cranes, these irrigated fields warm sooner than non-hayed fields, providing an abundant food source of invertebrates which are very important to nesting cranes.

Because of ample water in 2003, the maintenance staff was able to irrigate these wet meadows for a successful spring production of green browse and nesting areas.

#### ***b. Uplands***

These areas are not subject to flooding and do not contain wetland soils. They are dominated primarily by basin big sagebrush, juniper, rabbitbrush and perennial grasses such as Great Basin wild rye interspersed with locally abundant bunchgrasses. As uplands converge upon wetlands along the topographic gradient, bunchgrasses become more dominant as

shrubs are less tolerant to more hydric conditions. Uplands are dispersed throughout the Refuge, but the majority are located around Dorris Reservoir and within the Godfrey Tract. Small upland areas are located around the Refuge Headquarters, interspersed among wetland habitats and on the margins of the South Fork of the Pit River. Those upland areas adjacent to wetlands are managed for waterfowl production and are kept undisturbed with no haying or grazing activities. These areas, as well as shrub dominated uplands, also provide excellent habitat and cover for quail, pheasants, deer, rabbits, snakes, kangaroo rats, ground squirrels and several species of songbirds.

This habitat has been modified since settlement. The invasion of cheat grass, an exotic annual favored by frequent burns, provides an accumulation of fine fuels that burn readily and allows the sagebrush grasslands to burn more frequent stand replacing fires. The recent history of fire suppression has allowed unimpeded juniper encroachment. Vegetation changes precipitating modified plant community structure and composition within the uplands have altered the fire regime and subsequently changed wildlife utilization.

The uplands at Dorris Reservoir are dominated by juniper trees. Due to past and current uses of the Refuge uplands and other private uplands in Modoc County, high quality sage shrub-steppe habitat in this high desert area is becoming less abundant. The Refuge manages these uplands with long-term rest in order to ensure survival of remnant stands of native shrublands and grasslands.

No major management activities occurred within the uplands in 2003, but future juniper removal and native vegetation restoration projects have been proposed.

## **7. Grazing**

In combination with the haying program, the Refuge implements grazing of cattle on certain wet meadows in the late fall/early winter as another effective and economic tool to remove old plants and recycle nutrients. Private ranchers who possess grandfather rights are allowed to graze a predetermined number of head of cattle (measured in Animal Unit Measurements or AUMs) on the Refuge under a Special Use Permit with conditions.

In order to more closely monitor the number of cattle on the Refuge, this year Refuge staff counted and documented the number of cattle as they were placed on or removed from the Refuge. From 2001 to 2003, the following grazing of cattle, reported in AUMs, occurred on Modoc NWR:

**Table 5: Summary of Grazing Program at Modoc NWR from 2001-2003**

Field	Tons of Hay		
	2001	2002	2003
Bailey	91	171 (grazed 10/12-10/23)	395 (grazed 10/16-11/7)
Hansen West	0	73 (grazed 10/4-11/14)	94 (grazed 11/6-12/1)
Hamilton Tract	134 (grazed 9/5-11/28)	388 (grazed 10/11-12/17)	204 (grazed 9/27-10/20)
Grandma	0	155 (grazed 9/30-11/18)	0
Pine Creek	612 (grazed 8/24-11/24)	305 (grazed 9/25-11/22)	303 (grazed 9/23-11/22)
South Pine Creek	110 (grazed 9/10-10/29)	118 (grazed 9/19-11/15)	45 (grazed 9/30-10/8;10/20-11/3)
Town	0	549 (grazed 10/10-11/30)	392 (grazed 10/6-11/20)

## 8. Haying

Meadows are important feeding areas for sandhill cranes, geese, nesting waterfowl and mule deer. Breeding waterfowl and cranes feed on early plant growth and invertebrates that live in the soil. To encourage growth of this nutritious food, the Refuge implements a haying program at the end of the summer as an effective and economic tool to remove old plants and recycle nutrients. After the meadows are hayed, they are irrigated to stimulate new plant growth. Some, but not all, meadows are also grazed in late fall/early winter. Then in the following spring, the sun thaws the frozen soil of the meadows earlier, giving new plants a head start.

The Hamilton tract changed haying permittees and was fenced according to the 2000 Hamilton Tract Management Plan EA.

The past haying permittee for the Bailey Field is now the permittee for the Hamilton Tract. No new haying permittee was established for the Bailey field in 2003.



The haying program was delayed two weeks this year due to some re-nesting cranes and the presence of young crane colts.

Private farmers who possess grandfather rights or who have successfully bid on haying a specific meadow are allowed to harvest hay on the Refuge under a Special Use Permit with conditions. The following table summarizes the harvest of hay in August of 2003 on the Refuge, as well as the last two years for comparison purposes.

**Table 6: Summary of Haying Program at Modoc NWR from 2001-2003**

Field	Tons of Hay		
	2001	2002	2003
Bailey	0	178	0
Front	470	849	717
Hamilton Tract	116	168	218
Heifer (plus a portion of Sandy Slough)	73	227	344
House	0	119	92
Pine Creek	0	499	576
South Pine Creek	126	262	373
Sharkey	205	417	359
Town (plus a portion of Sandy Slough)	0	350	197

## 9. Fire Management

### *a. Wildland Fire History*

After the 1900's, human activities interrupted the natural fire frequency and patterns of burning. Livestock grazing reduced the light fuels that historically carried fires in the forests and interspersed meadows. Efforts to suppress naturally caused fires initiated in approximately 1906. At the same time, the effects of extensive livestock grazing were evident as the frequency of fires and the area burned decreased due to the loss of perennial grasses that provided the fine flash fuels.

Fire has been suppressed at Modoc National Wildlife Refuge since the early 1960's. Fire suppression and other land management practices

have altered plant community structure and composition, artificially modified habitats and affected the historic/cultural scene. Fire suppression activities have unintentionally deprived the land of fire, which is necessary for the perpetuation of certain ecological processes. As a result, fire adapted communities within the refuge have been altered, potentially creating a decline in species composition and biological diversity. The restoration of fire to ecosystems is an important objective in managing the natural and cultural resources of the refuge.

### ***b. Prescribed Fire***

The Refuge has a history of using prescribed fire to manage habitats and enhance wildlife habitat. Accurate records have been kept since 1985. The Refuge conducted prescribed burns during 10 years from 1985 to 2001. The annual prescribed burned area ranged from 50 to 275 acres, with 1,554 total acres burned at the Refuge. Most of the acres burned were in marsh, pasture, or agricultural habitats. Past private land management practices have included burning agricultural ditches in portions of the refuge area. However, these practices were inconsistent with prior USFWS management policy and have been rarely utilized since.

The goals of the prescribed fire program are to:

- Restore/perpetuate native grasses, forbs, and shrubs;
- Reduce non-native plant species;
- Periodically reduce dense cattail and bulrush growth in wetlands to improve the ratio of open water to cover;
- Maintain/rejuvenate nesting cover for waterfowl and other native birds;
- Maintain water delivery systems; and
- Protect riparian habitats from catastrophic wildland fire events through the establishment of firebreaks.

Prescribed fires may be used to meet specific resource management or fire management objectives including, but not limited to, hazard fuel reduction, wildlife management, restoration of former grazing lands, debris removal, and control of non-native species, when applicable. Prescribed fire is an important management tool implemented to maintain fire adapted ecosystems such as wet meadow/grassland communities in a more productive early seral stage, which are better able to serve as nesting and feeding habitats. Prescribed fire is also an important management tool to help control noxious weeds such as perennial pepperweed, scotch thistle, Canada thistle, bull thistle and Mediterranean sage.

Implementing prescribed fire reduces high fuel loads, which left intact, could result in catastrophic wildfires that could negatively impact habitats within the refuge. In a severe wildfire, considerable riparian vegetation could be lost which could compromise the integrity of river bank and berm stability. Wildfires could also result in difficult-to-control organic soil fires, loss of seasonal nesting and foraging habitat, soil erosion, an increase in

downstream sediment load and promote non-native plant infestations. Prescribed fire will also be used to reduce fuel loads along the refuge boundary-private lands interface, thereby reducing the potential liability of wildland fires spreading from public to private land.

Prescribed fire will be used as a complimentary management tool to other management actions to: reduce fuel loads, thus reducing the frequency and intensity of wildland fires; reduce weed infestations; increase native plant abundance, composition and diversity; improve water delivery systems; and improve open water to plant cover ratios in wetlands. There is an ongoing need to ensure the perpetuation of fire dependent ecosystems and natural resources while managing wildland fire to provide protection of life, property and cultural resources.

The Final Modoc National Wildlife Refuge Fire Management Plan (FMP) was completed and signed late in 2003. Although no prescribed fires were conducted on Modoc National Wildlife Refuge during the year, plans were made to burn several units in 2004.

### ***c. Wildland Fire***

The FWS has been recording wildland fire history at the Refuge since its establishment in 1960. The Refuge has had 12 recorded wildland fires in its 42-year history. One of those fires was caused by lightning and 11 were human-caused. A total of 71 acres of Refuge lands have burned due to wildland fire since the Refuge's establishment.

The neighboring Modoc National Forest (Modoc NF) has maintained fire history records since 1910. From 1980-1999, an average of 103 fires per year were recorded with 220 (11%) human caused and 1,848 (89%) lightning caused. Records from State, local and other Federal sources showed that wildland fire occurrence in the Upper Pit River Basin averaged more than 100 per year on approximately two million acres.

One small (.05 acre) wildfire occurred along County Road 56 and was extinguished by Alturas Rural Fire department.

## **10. Pest Control**

Carl Cox was hired as a TERM employee this year to implement the noxious weed control program at Modoc NWR. The noxious weed control program focuses on Scotch thistle, tall whitetop, Canadian thistle and Mediterranean sage, Class A noxious weeds in the State of California. A total of 273.75 hours were spent chemically and mechanically treating non-native plants throughout the Refuge. Much of the Refuge was surveyed for new infestations of noxious weeds. The total number of hours treating does not reflect the number of hours spent searching the Refuge for new areas of infestation. Table 7 describes the total amount of hours spent treating noxious weeds within the Refuge and chemicals utilized for control.

**Table 7. Noxious weeds, treating hours, and chemicals used for treatment on the Refuge in 2003.**

Noxious Weed	Treating Hours	% of Total	Chemical(s)
Scotch Thistle	134.5	49	Round-Up
Canadian Thistle	66	24	2,4-D, Transline
Hemlock	48	17	2,4-D
Tall Whitetop	8	3	2,4-D, Round-Up
Mediterranean Sage	12.5	5	2,4-D
Misc. Weeds	5	2	Round-Up
Total	274	100	

The primary Scotch thistle infestation continues to be in the Grandma Field where 60 hours of the total 134.5 hours were spent treating Scotch thistle. Although there is a reduction in the total amount of Scotch thistle present, it appears it will take persistence to eradicate the problem in this field. All other infested sites appeared to have a reduction or remained the same as the previous year. Herbicides and hand removal were utilized to treat the noxious weeds.

Four new patches of pepperweed were found and chemically treated. A total of 11 pepperweed units were treated throughout the Refuge. Patches treated in previous years appeared to be under control or almost eradicated, but the areas will continue to be monitored.

A fall treatment of Canadian thistle continued again this year across various units within the Refuge. Most thistle patches exhibited some level of control from last year's fall treatment of 2,4-D. Treatments in 2003 included the use of Transline in addition to 2,4-D.

Mediterranean sage was hand pulled or chemically treated in a unit near Goose Pond and near Dorris Reservoir. Both units are evincing moderate levels of control from previous years' treatments.

In total, 89.32 gallons of herbicide was used for weed control on approximately 300 acres within the Refuge in 2003. The 89.32 gallons of herbicide includes 9 gallons of Roundup, 70.75 gallons of Weedar 64, 1.07 gallons of Transline and 8.5 gallons of surfactant.

The Refuge continued to work with the Modoc County Department of Agriculture to manage weeds on the Refuge. In this cooperative program, the Refuge pays for half the costs of chemicals, equipment use and labor to control weeds on the Godfrey Tract. In the year 2003, the Refuge paid \$532.75 to Modoc County for this service.

The State of California Department of Food and Agriculture, Plant Health and Pest Prevention Services, Integrated Pest Control Branch continued to monitor a biological control program test plot of scotch thistle near Goose Pond. No results were reported in 2003.

## **11. Water Rights**

Modoc NWR holds water rights on two creeks which drain from portions of the Warner Mountain watershed, east of the Refuge. The Refuge holds 52% of the total water rights within the Pine Creek irrigation district, the major water source for the Refuge. A significant water right is also held on Parker Creek. Diversions in the winter from these two creeks fill Dorris Reservoir, an 11,500 acre foot storage area. Stored water from the Reservoir is utilized in spring and summer to irrigate Refuge meadows and to maintain pond and marsh water levels.

Water rights for the Refuge and surrounding landowners are enforced through a Watermaster, employed by the State of California Department of Water Resources. The Refuge paid \$6884.00 for this service from July 1, 2002 to June 30, 2003.

Beginning in 2002 and continuing through 2003, Refuge Staff along with Water Rights personnel from the Regional Office were involved in discussions with Pacific Gas and Electric (PG&E) over an outstanding complaint regarding an 1,100 acre foot junior water right. The original complaint was filed by PG&E in the 1980's and included all upstream water rights holders with rights junior to theirs. PG&E was under pressure from the State Water Resources Control Board to wrap up the complaints in light of the ongoing re-licensing of their Pit River hydroelectric project. Based upon PG&E data the refuge has averaged only 50 acre feet of harm a year over the past 20 years. The Service contends that, based upon the point of diversion for the PG&E right, there is no way that they can actually put this water to use. An agreement has been drafted and is currently undergoing RO review.

## **14. Farmers Home Administration Easements**

Refuge staff and Dan Strait, FWS Private Lands representative from the California/Nevada Operations Office, visited the existing FMHA easements administered by the Refuge. An attempt was made to contact the current landowners and evaluate current management practices. Refuge staff and Dan Strait also evaluated potential Partners projects on the Mokolstad and Chace properties.

Funding was provided for wetlands restoration on the Davis Easement, now owned and operated by Jim Madsen. After Jeff Rose, Region 1 Private Lands engineer, and Shannon Ludwig surveyed the property and designed a two phase restoration plan, Phase I was completed in July. Phase I entailed enhancing wetlands by creating two low-level berms with in-line water control structures, thus creating two small, open water wetlands. Existing warm-water springs served as the hydrologic inputs to their respective wetland features. The semi-permanent wetlands will provide brood water for waterfowl and roosting areas for sandhill cranes, which are abundant in the area. A similar Phase II project is to be completed in 2004.



Davis Easement before restoration.



Davis Easement after restoration.

## 15. Private Lands

Jeff Rose and Shannon Ludwig surveyed the Mokolstad and Chace properties to submit as 2003 Partners for Fish and Wildlife projects. Jeff completed survey maps detailing enhancement and restoration plans for each parcel.



The Talbott property, submitted in 2002 as Partners project, was funded and completed in July, 2003. The project involved enhancing a seasonal wetland adjacent to a semi-permanent wetland that was previously created as a Partners project in 1998. The new seasonal wetland was formed by building a low level berm with an in-line structure around a shallow depression. The berm around the existing semi-permanent wetland was breached and an in-line structure was installed to allow water to flow into the newly created seasonal wetland. The new seasonal wetland is part of a series of terraced wetlands that will provide foraging and staging areas for waterfowl. A new well pump and additional water line to provide alternative hydrologic input to the new seasonal wetland were also installed as part of the project.



Talbott private lands project before restoration.



Talbott private lands project after restoration.

The 160 acre Whitehead Riparian Fencing PFW project was completed under contract during summer 2003. The project entailed fencing the boundary of a 160 acre parcel along Emerson Creek on the east side of the Warner Mountains to prevent degradation of the riparian corridor through trespass livestock grazing. Emerson Creek has a viable population of native redband trout while the riparian area and adjacent uplands contain several plant species of concern.

## **G. WILDLIFE**

### **1. Wildlife Diversity**

An abundance of wetland habitat, in combination with riparian areas, wet meadows and uplands on Modoc NWR support a high diversity of wildlife species in this high desert area. A total of 246 different bird species have been documented at Modoc NWR. Seventy-seven of these species have been found nesting on the Refuge and 17 more are suspected of nesting. The Refuge's habitat is an important nesting area for more than 76 species of ducks, geese, greater sandhill cranes and several other species of marsh birds. In addition, 53 different species of mammals and 19 different reptiles and amphibians are known to inhabit the Refuge.

### **2. Endangered and/or Threatened Species**

Bald eagles (*Haliaeetus leucocephalus*) are the only Federally listed threatened and endangered species that are regularly found within the Refuge. Wintering bald eagles utilize the Refuge from October through March. Large cottonwoods and junipers near Dorris Reservoir, Refuge Headquarters, and the Pit River provide eagle roosting and perching sites. Six bald eagles were observed in 2003.

Western snowy plovers (*Charadrius alexandrinus nivosus*), a Federally listed threatened species, are rare summer residents to the Refuge. Limited numbers of snowy plovers have been observed during early summer.

Yellow-billed cuckoo (*Coccyzus americanus*), a rare migrant and rare summer resident, is a Federal candidate species and is State listed as endangered.

Modoc sucker (*Catostomus microps*), a Federally listed threatened species, are not known to occur within waters of the Refuge (Reid pers. comm.)

Slender orcutt grass (*Orcuttia tenuis*), a federally listed threatened species, is not known to occur within the Refuge.

There are several species which are on the State of California Endangered, Threatened or Species of Concern List. The Central Valley population of greater sandhill cranes and the willow flycatcher are both listed as threatened by the State. See Section G.4 for details on these species, their use of the Refuge and the Refuge's management practices in relation to these species in calendar year 2003.



### 3. Waterfowl

Waterfowl breeding pair and brood count surveys were conducted in 2003 and those data were used to calculate total production. General waterfowl population surveys were conducted throughout the year. Overall, the number of waterfowl utilizing the Refuge during summer and fall 2003 appeared to be normal with respect to previous years' population surveys. Spring populations peaked by late February and fall populations peaked by late September through early October. Most waterfowl had left by late November due to several storms and freezes.

#### *a. Ducks*

Many ducks re-nested in 2003 due to a spring flood. Mallards with broods were noted as mid-May, but most were not seen until late May to early June. Local birds were still present into late September. Broods of later nesting species, such as gadwalls, were not affected as much by the spring floods but, like some of the early nesters, incapable flying locals were observed well into September. The estimated duck production for specific species on Modoc NWR for the past five years is detailed in Table 8.

During the spring migration of 2003, many ducks staged in the floodplain and Sharkey field areas due to spring flooding. During the fall migration a large number of ducks migrated south onto the Refuge during mid to late September and continued well into October. After the opening of waterfowl hunting season on October 11th, the number of ducks on the Refuge slowly dropped due to harvest by hunters and the continued migration of the ducks. Throughout the remainder of the fall migration, no additional large groups of ducks moved onto the Refuge. As mentioned earlier, most waterfowl had left by mid-November due to several storms and freezes. Noted sightings this year included several male Eurasian wigeon.

**Table 8. Estimated Breeding Pairs and Production at Modoc NWR from 1998 to 2003**

Year	Species	Breeding Pairs	Total Production
1998	No data available. Breeding pair count was not conducted due to staff turnover.		
1999	Mallard	315	1461
	Gadwall	249	1000
	Northern Pintail		
	Cinnamon Teal	73	247
	American Wigeon	32	156
	Northern Shoveler	89	432
	Redhead	44	195

	Lesser Scaup	48	165
2000	Mallard	315	1443
	Gadwall	249	986
	Northern Pintail	11	49
	Cinnamon Teal	73	246
	American Wigeon	32	155
	Northern Shoveler	89	432
	Redhead	44	191
	Lesser Scaup	48	164
2001	Mallard	482	1920
	Gadwall	401	1911
	Northern Pintail	4	15
	Cinnamon Teal	104	454
	American Wigeon	43	203
	Northern Shoveler	77	233
	Redhead	73	327
	Lesser Scaup	35	113
2002	No data available. Breeding pair count was not conducted due to staff turnover.		
2003	Mallard	767	1534
	Gadwall	866	1732
	Northern Pintail	17	32
	Cinnamon Teal	376	752
	American Wigeon	52	104
	Northern Shoveler	235	423
	Redhead	122	440
	Lesser Scaup	61	122

## b. Geese

In 2003, the Canada goose population surveys peaked on the Refuge at 2,034 birds in February. Canada geese initiated nesting early this year due to unseasonably warm and dry conditions throughout January and February. Most broods were off the nest before an extremely wet spring period and the first broods were noticed on April 3<sup>rd</sup>. Although goose

production continued to rise this year, some broods may have succumbed to the wet and freezing conditions this area experienced for approximately six weeks. Table 9 describes Canada goose production on Modoc NWR from 1998 to 2003.

**Table 9. Canada Goose Breeding Pairs and Production at Modoc NWR from 1998 to 2003.**

Year	Breeding Pairs	Production
1998	606	1430
1999	*	*
2000	*	*
2001	672	2236
2002	364	1325
2003	563	2252

\* No data available. Breeding pair count was not conducted due to staff turnover.

Pacific Flyway geese usually do not migrate from the north to the Refuge until mid-November to mid-December when winter storms and cold temperatures push them south. In 2003, migrating Canada geese did not move into the Refuge until late-December.

### **c. Swans**

In 2003, Tundra swan population surveys peaked on the Refuge at 240 birds in March. The ponds and other wetland habitats on Modoc NWR provide a staging area for tundra swans during migration with the highest numbers of swans observed in late winter and early spring.

No Trumpeter swans were recorded on the Refuge this year unlike 2002 when three remained here throughout the winter.

## **4. Marsh and Water Birds**

Approximately 15 species of marsh and water birds used Modoc NWR during the year, including: great blue herons, black-crowned night herons, great egrets, snowy egrets, greater sandhill cranes, American bitterns, pied-bill grebes, eared grebes, western grebes, Clark's grebes, white-faced ibis, American white pelicans, double-crested cormorants, Virginia rails and sora rails. Greater sandhill cranes, pied-billed grebes, eared grebes, western grebes, American bitterns and black-crowned night herons were documented nesting this year on the Refuge, but production data was determined only for the cranes.

The Pacific Flyway population of greater sandhill cranes is currently about 4,000 birds and is listed by the State of California as a threatened species. Modoc NWR is the most important nesting area in northeastern California for greater sandhill cranes, therefore, the Refuge places special emphasis on habitat management and data collection for this species. The Refuge supports 40 to 50

nesting pairs with an average recruitment (number of young surviving to adulthood) rate of 12 cranes/year over a 20 year period. Greater sandhill cranes require wet meadows and wetlands to support their breeding and brood rearing efforts. A Modoc NWR telemetry study from 1990-1992 documented that wet meadow, irrigated pasture and marsh habitat comprised 77% of brood habitat. In certain tracts on the Refuge, nesting densities have been as high as 1 pair per 30 acres but more commonly 1 pair per 70-100 acres. Many of these birds also use adjacent areas off the Refuge to forage and feed their young.

Sandhill cranes arrived February 14<sup>th</sup> and the last ones did not leave until mid-October. Cranes were surveyed and monitored during that entire period. Breeding pair counts and nesting surveys of cranes were conducted during the spring, in late April to early May, and crane production and nest success surveys were conducted from May 13<sup>th</sup>, when the first crane colt was observed near the North 395 Pond, to early September. The wet spring period forced some cranes to nest late or re-nest which resulted in local birds still present by September 1. Haying was delayed for two weeks due to young crane colts present within some of the wet meadows.

Table 10 summarizes the data collected for greater sandhill cranes at Modoc NWR from 1999 to 2003. In 2003, 48 nesting pairs were documented and 39 nests were located. During the summer, 25 crane colts were observed in or near the Refuge. Colts fledged were determined through observations in the late fall 2003 and spring 2004.

**Table 10: Greater Sandhill Crane Production at Modoc NWR from 1999 to 2003.**

<b>Year</b>	<b>Nesting Pairs</b>	<b>Nests Located</b>	<b>Successful Nests</b>	<b>Percent Successful</b>	<b>Colts Fledged</b>	<b>Percent Recruitment</b>
<b>1999</b>	<b>44</b>	<b>13</b>	<b>7</b>	<b>54%</b>	<b>14</b>	<b>16%</b>
<b>2000</b>	<b>32</b>	<b>10</b>	<b>8</b>	<b>80%</b>	<b>20</b>	<b>31%</b>
<b>2001</b>	<b>34</b>	<b>19</b>	<b>10</b>	<b>53%</b>	<b>8</b>	<b>12%</b>
<b>2002*</b>	<b>n/a</b>	<b>12</b>	<b>7</b>	<b>58%</b>	<b>7</b>	<b>n/a</b>
<b>2003</b>	<b>48</b>	<b>39</b>	<b>22</b>	<b>56%</b>	<b>16</b>	<b>17%</b>

\*Limited surveys were conducted due to staff turnover

Very successful crane banding operations were conducted from June 30<sup>th</sup> through September 13<sup>th</sup>. A total of 20 cranes were captured and banded this year, one which was a recapture of a crane that was banded in 1985 (P009). Four adults, 15 locals, and one hatch-year bird were banded. An airboat was successfully utilized this year to capture three adults and the hatch-year bird. All the locals and one flightless molting adult were captured on foot. The airboat captures took place in Teal Pond and Goose Pond where the adults were roosting at night. Refuge staff did not use rocket nets to attempt to capture and

band adult cranes this year, a technique not used since 1992. The following table shows the number of cranes banded at Modoc NWR from 1999 to 2003.



Recapture of Sandhill Crane P009.

**Table 11: Crane Banding Data at Modoc NWR from 1999 to 2003**

Year	Number of Cranes Banded
1999	2
2000	1
2001	1
2002	3
2003	20

## **5. Shorebirds, Gulls, Terns and Allied Species**

Sandpipers, Wilson's phalaropes, greater yellowlegs, willets, dunlins, long-billed dowitchers, long-billed curlews, black-necked stilts, killdeer, common snipe, American avocets, Forster's terns, Caspian terns, ring-billed gulls and California gulls were all documented at the Refuge throughout the year. The Refuge provides shallow ponds and exposed mudflats which are favorite feeding areas for shorebirds and open water areas for gulls, terns and other species. In 2003, The North Grain Field provided an exposed mudflat during drawdown where many black-necked stilts and American avocets nested. The following species were documented as nesting on the Refuge, but no production data were formulated: long-billed curlews, killdeer, black-necked stilts and American avocets.

## **6. Raptors**

A total of 15 species of raptors, owls and allied species (such as turkey vultures) were documented on the Refuge this year. Raptors who nested on the Refuge included American kestrels, great-horned owls, barn owls, short-eared owls, northern harriers and red-tailed hawks, although production data were not determined.



Great Horned Owl on nest.

## **7. Other Migratory Birds**

Small, but important, riparian areas on the Refuge provide nesting and forage areas for raptors, woodpeckers and neo-tropical migrants such as warblers, swallows, flycatchers and sparrows. Upland areas on the Refuge provide forage and nesting sites for California quail, ring-necked pheasants, waxwings, western meadowlarks, sage thrashers, American robins, bluebirds, finches and other songbird species.

A mist netting project at Modoc NWR initially began in 1982 as a ten year study to monitor the breeding population of yellow warblers and willow flycatchers.



After 1992, Refuge staff continued the mist netting project and began formally submitting data to Monitoring Avian Productivity and Survivorship (MAPS) detailing the various neotropical migrants captured. MAPS data are collected at various locations all over the United States by the Institute for Bird Populations in Point Reyes, California. The Refuge's MAPS station continued its operation in 2003 at the riparian habitat on the Refuge's Sub-headquarters. Table 12 describes effort data for the Refuge's MAPS station for the past five years.



Female Bullock's Oriole captured and banded during MAPS operation.

**Table 12. MAPS station operation at Modoc NWR from 1999 to 2003.**

<b>Year</b>	<b>Total Days of Operation</b>	<b>Total Net Hours</b>	<b>Total Birds Captured</b>	<b>Total Number of Species</b>
<b>1999</b>	<b>9</b>	<b>no data</b>	<b>305</b>	<b>no data</b>
<b>2000</b>	<b>8</b>	<b>448</b>	<b>245</b>	<b>22</b>
<b>2001</b>	<b>8</b>	<b>448</b>	<b>295</b>	<b>no data</b>
<b>2002</b>	<b>no data</b>	<b>no data</b>	<b>no data</b>	<b>no data</b>
<b>2003</b>	<b>8</b>	<b>381.83</b>	<b>151</b>	<b>24</b>

Of the 151 birds banded among 22 different species, most were tree swallows, song sparrows, and yellow warblers. Vagrants banded this year included a northern waterthrush. Table 13 describes species banded during MAPS operation at Modoc NWR in 2003.

**Table 13. Number of bird species banded during MAPS operation at Modoc NWR in 2003.**

<b>Species</b>	<b>Number Banded</b>
American Robin	6
Barn Swallow	3
Brown-headed Cowbird	5
Brewer's Blackbird	3
Bullock's Oriole	8
Common Yellowthroat	1
Downy Woodpecker	1
European Starling	4
Gray Flycatcher	1
House Finch	5
House Sparrow	9
House Wren	3
Lesser Goldfinch	4
MacGillivray's Warbler	1
Northern Waterthrush	1
Orange-crowned Warbler	1
Red-winged Blackbird	2
Song Sparrow	30
Tree Swallow	38
Willow Flycatcher	4
Wilson's Warbler	8
Yellow Warbler	13
<b>Total</b>	<b>151</b>

## **8. Game Mammals**

In 2003, the mule deer population continued to thrive finding plenty of forage areas and cover in the various habitats found on the Refuge. During the summer, mule deer were less common on the Refuge, as they headed to higher elevations for greener pastures. The mule deer returned to the Refuge in October as hunting season began, as well as when temperatures dropped and occasional snow showers began to blanket the ground.





Mule deer in the Town Grain Field.

## **10. Other Resident Wildlife**

Other mammals observed on the Refuge this year include: black-tailed hare, Nuttall's cottontail, pygmy rabbit, Belding's ground squirrel, Beechey's ground squirrel, beaver, various gophers, various mice, muskrat, porcupine, coyote, raccoon, mink, long-tailed weasel, badger, striped skunk, spotted skunk, river otter and bobcat. Other mammals are known to occur on the Refuge, but were not specifically observed this year, e.g., pronghorn antelope and mountain lion.

## **11. Fisheries Resources**

The following fish species are known to occur within the various waters of Modoc NWR: Pit-Klamath brook lamprey, brown trout, rainbow trout, Goose Lake redband trout, Sacramento sucker, bluegill, green sunfish, largemouth bass, brown bullhead, channel catfish, hardhead, Pit roach, Sacramento squawfish, speckled dace, Tui chub and Pit sculpin. It is unknown how low water levels during the winter at Dorris Reservoir affected the fish population this year. Recreational fishing appeared to be normal during fishing season for anglers who used the Reservoir. No restoration work for fishery resources was completed on the Refuge this year.

## **13. Surplus Animal Disposal**

Over the past ten years, the Refuge has collected a large number of bird and mammal specimens. Those that were no longer needed in law enforcement cases, as well as those not needed by the Refuge, were disposed of or frozen for potential specimen display.

## 15. Animal Control

This year, the Refuge staff continued predator management through techniques such as trapping as a method to control predation of greater sandhill cranes. Management involved 7 coyotes.

## 16. Marking and Banding

Refuge staff continued with waterfowl banding in 2003 and initiated a Canada goose collaring program (discussed in *Section D. Planning, Part 5. Research and Investigations*). As mentioned previously under the *Marsh and Water Birds* section of this report, greater sandhill crane banding operations were conducted from June through September with four adults and 16 juvenile cranes captured by foot and airboat and banded in 2003. During the MAPS operation, 151 birds were banded, as previously mentioned under the *Other Migratory Birds* section in this report.

In June, 2003, Canada geese were captured using a drive trap and with an airboat at night. Drive traps were set up in Little Goose Pond and Goose Pond. Geese were captured with an airboat in Little Goose Pond, Goose Pond, and teal Pond. A total of 156 geese were banded, of which, 143 were fitted with collars. The collars were white with black symbols, designated in a number, number, number, letter ("E") sequence. The collars fitted on geese in 2003 were 001E through 143E. Notes were taken on age only.



Releasing collared Canada geese.

In late August and early September, ducks were captured, and subsequently banded, in swim-in traps located on Goose Pond, the Pit River, North 395 Pond, Middle 395 Pond, South 395 Pond and the Pit Marsh. In mid-September, ducks were captured with an airboat at night and banded. Notes were taken on duck species, sex and age.





Swim-in trap to capture ducks.



Banded mallard.

A total of 365 birds were banded on the Refuge including Sandhill cranes, Canada geese and ducks. No preference was given to any species, age or sex except Canada geese where it was species specific and there was an attempt to capture and collar more adults. Table 14 describes the number of each species banded at Modoc NWR in 2003.

**Table 14. Number of bird species banded at Modoc NWR in 2003.**

<b>Species</b>	<b>Number Banded</b>
American Coot	2
American Wigeon	1
Canada Goose	156
Cinnamon Teal	10
Gadwall	65
Lesser Scaup	2
Mallard	95
Northern Shoveler	1
Redhead	13
Sandhill Crane	22
<b>Total</b>	<b>365</b>

## **H. PUBLIC USE**

### **1. General**

Use of Modoc NWR by the public during the year 2003 included a variety of recreational and educational activities such as Centennial time capsule dedication, fishing at Dorris Reservoir, waterfowl hunting, a special junior waterfowl hunt, wildlife observation, environmental education and a migratory bird festival. Approximately 60,000 visitors were recorded for the Refuge this year.

Retired California Department of Fish and Game Warden, Mike Wolter, conducted a Hunter Safety Certification class in September. Mike used the Refuge conference room for the classroom portion of the program. Ten students participated and were able to receive their certification in time for the October waterfowl opener.

The Refuge issued 8 news releases to local and regional newspapers covering topics such as Centennial events, waterfowl hunting, special junior hunts and other special events. The majority of newspapers were cooperative and supportive in helping the Refuge disseminate information on these issues.

The Refuge Manager was interviewed by the local Radio station to provide general Refuge information as well as highlighting the Refuge Centennial.

### **2. Outdoor Classrooms – Students**

Approximately 240 students, teachers and parents participated in various environmental education activities on the Refuge throughout 2003. Programs ranged from staff guided walks through the wetlands to more detailed presentations on a variety of topics from watersheds to wildlife and habitat management.



Refuge Biologist, Shannon Ludwig, talking to school group about wetlands.

In collaboration with the local River Center, the Refuge is hoping to expand its role as an environmental education resource for the community. To that end, Refuge and River Center staff made several presentations to local educators during school in-service days. One of the main components of this effort is to have classrooms adopt portions of the Pit River and conduct monitoring and restoration activities on these reaches. We hope to have the program up and running in 2004.

#### **4. Interpretive Foot Trails**

The Wigeon Pond walking trail was enjoyed by numerous visitors in the year 2003. This trail provides an alternative to the Auto Tour Route for those visitors who wish to get a more personal look at wildlife on the Refuge.

#### **5. Interpretive Tour Routes**

The three mile Auto Tour Route continued to be a main source of recreational enjoyment for visitors at Modoc NWR. Numerous visitors enjoyed this route for wildlife observation as well as walking and jogging. A first for this year was the use of this route for cross-country skiing after one of our heavier snowfall events.

#### **6. Interpretive Exhibits/Demonstrations**

The Refuge hosted the Fourth Annual Modoc Migratory Bird Festival on September 13 & 14, 2003 in coordination with the Modoc County Natural Resources Education Committee. This event is a community-oriented wildlife festival which celebrates migratory birds and the natural environment by providing a fun and educational event for the public. Through workshops,



exhibits and tours the festival highlights resident and migratory wildlife, their habitat and our interaction with these resources. The festival provides a wonderful opportunity for Refuge staff to interact with local citizens and provide outreach to 300-500 people.



Refuge Supervisor, Dave Paullin, addresses audience at Time Capsule dedication.

The kickoff event for the festival this year was the dedication of our Centennial Time Capsule. Refuge Supervisor, Dave Paullin, was on hand to speak to the crowd that gathered for the ceremony. Included in the ceremony were the top finishers in our Centennial postcard contest. Their artwork and essays were included in the many items that went into our time capsule.

Throughout the year the Refuge Centennial Time Capsule was on display at various locations throughout the community. Along with the capsule was information detailing the Refuge System and its Centennial and an invitation to the community to provide materials to be placed in the capsule. Items placed into the Modoc Time Capsule included: Pelican Island Celebration Memorabilia; Winning Centennial Post Card entries, with photographs of the artist; a sandhill crane leg with bands; duck band donated by Refuge neighbor Curt Talbott; a local newspaper, and a videotaped message from Refuge staff.



Postcard Contest Winner Kristi Zendajas

As part of this event the Refuge conducted an art and essay contest in the local schools, with the winning entries being placed into the capsule. Numerous donations were received from local businesses to be awarded as prizes. The Refuge received 225 entries from which a panel of judges selected the winning entrants. Judges included a County Commissioner, Superintendent of Schools, local California Department of Fish and Game biologist, and the Refuge biologist. The top 3 places were selected for each of the following age categories; K-3, 4-6, 7-8 (the High School did not participate). Photos of the winners along with all of the artwork were on display throughout the year in the Refuge office.

Refuge staff helped to create and staff the Modoc Noxious Weed Working Group booth at the Cedarville fair in August. The booth provided a great opportunity to showcase the weed control efforts undertaken by the Refuge and to disseminate lots of information to folks about noxious weeds.

Staff participated in the Annual Children's Fair with a Refuge booth. General information regarding the Refuge and the FWS was presented along with information highlighting the Refuge System Centennial.

An Open House was held in March to commemorate the Refuge Centennial. Approximately 30 individuals stopped by to visit with the Refuge staff and enjoy some blue goose cake and cookies.

## 7. Other Interpretive Programs



Bat night at the Refuge was a big hit!

Since its inception in 2002 Refuge employees have been heavily involved with the environmental education programs of the River Center. The goal of the River Center is to provide educational programs and resources which emphasize the Pit River watershed and its resources while providing an orientation to and understanding of the role of the watershed to the areas school children, local citizens and the many visitors to the county. During 2003 numerous events were held on the Refuge including school tours, wetlands ecology demonstrations, goose and duck banding, native grass planting, noxious weed identification and removal and bat education. The programs of the River Center are a natural fit with the Refuge and it is hoped that our close association with the Center will expand the use of the Refuge as an educational resource.



Refuge biologist, Shannon Ludwig, talking to school group at the River Center.





Duck banding demonstration.



Goose banding roundup.

Presentations were given to several local service organizations and the Modoc County Fish, Game and Recreation committee regarding Refuge programs and activities.

## 8. Hunting

Conditions were near optimal for the 2003-2004 waterfowl opener. By opening weekend all wetland units were at or near full and the refuge was holding good numbers of ducks. Table 15 describes the dates and limits for the season:

**Table 15: Regulations for the 2003-2004 Waterfowl Hunting Season for Northeast California**

Waterfowl	Season	Limits	Details or Notes
Ducks	10/11 to 12/9 12/12 to 1/25	7 daily, 14 in possession	Daily bag included the following: up to 7 mallards (but <u>no more</u> than 2 female), 1 pintail, 1 canvasback, 2 redheads, & 4 scaup
Pintail	10/11 to 11/30 1/17 to 1/25		
Canvasback	10/11 to 12/9		
Geese	10/11 to 1/18	Total (white & dark): 3 daily, 6 in possession	Species Limits: Dark Geese (Canada, white-fronted & cackling): 2 daily - of which only 1 may be a cackling goose White Geese (Snow & Ross): 3 daily, 6 in possession
Coot & Moorhen	10/11 to 1/25	25 daily, 50 in possession	- -
Snipe	10/11 to 1/25	8 daily, 16 in possession	- -

Nearly 300 people applied for permits to hunt the opening weekend on the Refuge. Permits were limited to 100 hunters and were good for both days of the opening weekend. Those hunters that participated were rewarded with a fairly good hunt, posting a 5.23 average on Saturday and a 3.16 average on Sunday. The harvest tallied 689 ducks and 25 geese with mallard and gadwall making up the majority of the bag. Duck hunting remained very productive through early November when the first hard freezes moved the majority of the ducks south. This same mild weather during the early stages of the season kept the goose hunting action very slow. The harvest picked up dramatically with the onset of sustained cold weather in December and remained fairly productive through the end of the hunting season.

The following table summarizes the waterfowl harvest at Modoc NWR during the last three hunting seasons:

<b>Table 16. Summary of harvest statistics for the 2001-2002, 2002-2003, and 2003-2004 hunt seasons at Modoc NWR.</b>					
<b>Year</b>	<b># of Hunters</b>	<b># of Ducks Harvested per Hunter</b>	<b># of Geese Harvested per Hunter</b>	<b>Total Ducks Harvested</b>	<b>Total Geese Harvested</b>
2001-2002	1,155	0.62	0.33	715	386
2002-2003	1,412	1.09	0.22	1321	309
2003-2004	1,475	1.59	0.19	2307	275



**Youth Waterfowl Hunt participants with the day's bag.**

The Refuge again hosted a one day Junior Waterfowl Hunt on September 27<sup>th</sup>. Twenty six young hunters participated and were treated to a barbecue and orientation on Friday evening. By all accounts the hunt was a great success for the juniors and their adult chaperones. The harvest for the day was 116 ducks and 7 geese for a 4.46 birds per hunter average. Support for the event was generously provided by the California Waterfowl Association and Ducks Unlimited.

## **9. Fishing**

Dorris Reservoir is the only body of water where fishing is allowed on the Refuge. The Reservoir is a popular fishing area for local anglers. Largemouth bass, channel catfish, sunfish and rainbow trout can be found in the Reservoir. Fishing is permitted during daylight hours except during waterfowl hunting season (usually October through January when the reservoir is closed to all public access). All California State fishing regulations apply to fishing at the Reservoir. As the result of generous late spring precipitation the Reservoir was full to capacity going into the summer. The high water levels brought the local fishermen out in good numbers with an estimated 16,000 angler visits for the year. Most fishing effort was focused on the warm water species present in the reservoir.

## **11. Wildlife Observation**

It was estimated that approximately 48,500 visitors utilized Modoc NWR for wildlife observation in the year 2003. Wildlife observation at the Refuge focuses on waterfowl and other marsh birds as observed from the Auto Tour Route around Teal Pond. Visitors from the local area also enjoy the mule deer and raptors that frequent the Refuge. A large number of out-of-town visitors continue to find this small, isolated Refuge to not only observe water birds (especially nesting greater sandhill cranes), but to also enjoy raptors and songbirds. This latter phenomenon is consistent with what is occurring all across the country, as birders seek new and interesting locations to see a variety of birds. The Refuge still does not receive the amount of visitors that other National Wildlife Refuges see each year, but Refuge staff continues to hear that the Refuge is a nice stop as visitors make their way to or from Reno, Redding, Bend or other National Wildlife Refuges in the area.

## **12. Other Wildlife Oriented Recreation**

Wildlife photography continued to be a popular means of recreation at Modoc NWR in the year 2003. Due to the scenic beauty of the area with the Warner Mountains as a backdrop, as well as the variety of wildlife that frequents the Refuge's wetland habitats, many photographers stopped at the Refuge to capture waterfowl, greater sandhill cranes and mule deer on film. Refuge vistas and wildlife graced the pages of the Modoc County Record on many occasions throughout the year.

## **16. Other Non-Wildlife Oriented Recreation**

Water skiing, boating, swimming and picnicking all occurred at Dorris Reservoir in the year 2003. While water skiing is still a permitted use it occurs very infrequently.

The use of the Refuge auto tour route for jogging and walking continues to increase in popularity. The Refuge has a good number of "regulars" throughout the year with a big surge in use during the summer months.



## **17. Law Enforcement**

A fair amount of patrol time was spent throughout the year both at Dorris Reservoir during the summer months and then in the public hunting area during the waterfowl hunting season. Numerous contacts were made to provide information on Refuge regulations and ensure compliance. With the 25% mandate for collateral duty LE officers Modoc may soon find itself without any LE staff.

Four NOV's were written during 2003; all four were for trespass and resulted from a forced entry onto the Refuge during closed hours.

## **I. EQUIPMENT AND FACILITIES**

### **2. Rehabilitation**

Annual rehabilitation by Refuge staff occurred in the year 2003, mostly involving the repair and maintenance of dikes, levees and water control structures that had received routine damage from the weather and wildlife (specifically muskrats, beavers and ground squirrels). Specific rehabilitation or improvement projects that were performed by Refuge staff during 2003 included dike and island maintenance in the Upper and Lower Duck Ponds and the Fluornoy Pond, rehabilitation of the Gadwall/Railroad Pond complex and rehabilitation of the Heifer dike and canal.

Another project, the rehabilitation of the Grandma Tract - Phase I, was completed under contract administered through Ducks Unlimited. The project consisted of converting a leveled and checked hay field back into wetlands. A meandering channel was created through the southern half of this 310 acre unit. This channel is interrupted by 4 low level contour dikes with water control structures to create shallow open water areas and allow for sheet flooding of the entire unit.

In the Duck and Fluornoy Ponds overly tall islands were knocked down in elevation and sloped while others were combined to make larger irregular shaped islands. Several of the islands were wrapped with an erosion mat to protect them from wave erosion. Now all of the islands do not exceed more than a foot and a half above the maximum water level.

In Lower Duck Pond, remnants of an old dike that had been segmented into islands was removed along with several islands. Material from these islands was used to rehabilitate the Upper Duck Pond dike. The dike no longer has vertical sides or a roller coaster surface. The barrow ditch, created during construction of the Upper Duck Pond dike, was filled in to within a foot and a half below the pond surface.



Erosion mat placed on an island in Upper Duck Pond.

Approximately three quarters of a mile in length are the Heifer dike and canal. Before cleaning the canal, the dike was cored lengthwise down the middle. During this phase of the operation, all muskrat burrows were caved in and old rusty irrigation pipes were removed and replaced. Two 3 foot diameter stop board water control structures in the canal were also replaced. The smaller delivery pipes were replaced with plastic pipe with metal slide gates. After the coring was completed, the canal was cleaned. The spoil from the canal was used to reshape (fill in the low areas and widen the narrow portions) the dike.



The Heifer Field dike being cored with the use of the excavator. While coring the dike, numerous muskrat burrows were found and caved in.



Heifer dike all cored and the canal cleaned.



Repacking the Heifer dike with a rented sheep's foot roller.

The Railroad – Gadwall Pond complex received a much needed facelift this year. Four interior dikes and one large island (more like a spoil pile) were removed to create one larger pond. Over a quarter of a mile of interior dikes and old canal, separating one pond into two small ponds (less than a half acre), got scraped up and hauled away. The material that was removed was used to repair exterior dikes through raising the elevation of the low areas, filling in the burrow cave-ins and, best of all, creating a six to one slope on the pond side. Controlling the water levels in this multi-pond unit used to take six water control structures, now it is done with two. A new addition to the pond is a submerged gravel bar.



The areas showing bare dirt are the dikes and island that were removed from Railroad Pond.





The exterior dike reshaped with a six to one slope and a four inch layer of gravel.

### 3. Major Maintenance



Old portions of the house being removed to make way for the new garage.

MMS funding was received in FY 03 to rehabilitate the Managers residence. Work included removal of lead and asbestos, insulating exterior walls, bringing the electrical system up to code, hardwired smoke alarms, replacing rotten exterior siding, painting the exterior and window and door replacement. The decision was also made to remove several rooms attached to the main body of



the house and replace them with a garage. The portions removed were full of lead and asbestos issues and were in an extremely degraded condition.

Twenty thousand dollars of additional maintenance funding was received in 2003 to address the deterioration of the Refuge entrance road. Funding was used to repair several potholes which had developed in the roadway over the winter followed by an application of pavement sealer to the entire road surface.



Garage addition under construction.

## 5. Communication Systems

With the help of SAMMS funding the station internet connectivity was improved through the installation of a satellite internet system. The connection speeds have improved dramatically with this system, though not to the extent that we had hoped.



New satellite internet system courtesy of SAMMS.

Two new PC's and a laptop were procured this year to help with the SAMMS workload as well.



WG staff enjoying their new computer.

## **8. Other**

FY 2003 equipment rental funds were used to rent a vibrating sheep's foot roller to use during the Heifer Dike and Railroad/Gadwall Pond rehabilitation projects. Rental funds were also utilized to rent a semi-tractor, belly dump trailer and operator to haul gravel for the Railroad Pond dike.

## **J. OTHER ITEMS**

### **1. Cooperative Programs**

The Refuge continued to host meetings and participate in the Modoc County Noxious Weed Working Group.

### **2. National Wildlife Refuge System Centennial Celebration**

Shannon Ludwig, Refuge Biologist, and Greg Albertson and Bradley Storm, Engineering Equipment Operators, all took part in the Refuge Centennial Celebration in March at Pelican Island National Wildlife Refuge.

On March 13<sup>th</sup> – 15<sup>th</sup>, 2003 Modoc National Wildlife Refuge employees Shannon Ludwig, Greg Albertson, and Brad Storm had the honor of attending the U.S. Fish and Wildlife Service Centennial Celebration event at Pelican Island National

Wildlife Refuge near Sebastian, Florida. The celebration commemorated the 100<sup>th</sup> anniversary of Pelican Island National Wildlife Refuge and the National Wildlife Refuge System.

One hundred years ago, President Theodore Roosevelt established the five-acre Pelican Island, off the east coast of Florida, as the nation's first federal bird reserve. At the time, wading birds were being killed indiscriminately because their feathers were in high demand as fashion accessories. Pelican Island became a sanctuary and national symbol for conservationists. The establishment of Pelican Island as a federal bird reserve set in motion a commitment to the preservation of our wildlife heritage and became the forerunner of our modern National Wildlife refuge System.

Today, that system is managed by the U.S. Fish and Wildlife Service and is the only network of federal lands dedicated specifically to wildlife conservation. It includes 540 National Wildlife Refuges on 95 million acres. Many of the refuges are strategically located along the nation's four major migratory flyways and provide resting points for birds that migrate hundreds or thousands of miles in search of food or breeding and wintering grounds.

In addition to providing for millions of migratory birds, refuges also teem with plants, fish, insects, reptiles, mammals, amphibians and other animals. More than 50 National wildlife refuges were established specifically to protect endangered or threatened species.

National Wildlife Refuges provide unparalleled outdoor activities including hunting, fishing, environmental education, wildlife observation and photography that make them special, peaceful places for all Americans to enjoy.

Shannon, Brad and Greg were invited to participate in this landmark celebration with 150 other U.S. Fish and Wildlife Service employees. During the event, they reacquainted with former co-workers and made new friends with current employees.

Prior to the Centennial Celebration they witnessed the National Wildlife Refuge System Time Capsule Exhibit Dedication Ceremony where U.S. Fish and Wildlife Service Director Steve Williams unveiled an exhibit showcasing artifacts from some of America's 540 national wildlife refuges including a banded Greater Sandhill Crane leg from Modoc National Wildlife Refuge.

The 150 selected Service employees were involved on-stage during the Centennial Celebration Ceremony and had the opportunity to listen to inspiring messages from United States Senator Bill Nelson, Secretary of Interior Gail Norton, Assistant Secretary of the Interior for Fish and Wildlife and Parks Craig Manson and Director Steve Williams about the National Wildlife Refuge System. Their messages reflected on the history and accomplishments of the refuge system and provided a vision for the future while emphasizing the stewardship legacy that has been provided for future generations.

The Centennial Celebration also featured the U.S. Postal Service Commemorative Stamp First Day of Issue Ceremony. A stamp with a picture of a brown pelican was unveiled to mark the 100<sup>th</sup> anniversary of Pelican Island National Wildlife Refuge and the National Wildlife Refuge System.

The Celebration involved thousands of participants including visitors, U.S. Fish and Wildlife Service employees, volunteers and vendors that produced this once in a lifetime event. It was a remarkable gathering of people whose one common interest was that of the National Wildlife Refuge System and what it represents. As the sun set on 100 years of wildlife conservation, we look forward to the next 100 years where we progress with the conservation and management of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.



Brad, Shannon, and Greg at the Refuge Centennial Celebration near Pelican Island NWR.

#### 4. Credits

To compile specific information for the calendar year 2003, various Refuge documents and reports were used, in addition to the contributions of the entire staff:

Steve Clay	Final Review , A, C, D, E , H, I.1, 2,5, J
Shannon Ludwig	A, B, C. 4, D.5, E. 2,4,7, F, G, H.8
Alicia Winters	Final Review, Editing, E.5
Greg Albertson	F.11, I
Bradley Storm	F.4, 10, I
Carl Cox	F.10, I

## K. FEEDBACK